PATENT ABSTRACTS OF JAPAN

(54) IMAGE RECORDING AND REPRODUCING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To apply companding processing to video data with a single companding circuit through selection depending on the mode of dynamic image (MPEG) and still image (JPEG).

SOLUTION: The device is provided with a conversion means 404 converting a video signal into a digital signala CODEC section 409 applying selectively MPEG or JPEG method compression processing to the digital signal to generate compressed dataand a recording section 415 recording the compressed data. Then the method for compression processing is selected for the CODEC section 409 depending on the selection instruction in the compression processing mode as to whether the MPEG system or the JPEG system is adopted for the compression processing. Furthermorethe CODEC section 409 is a circuit conducting expansion processing of the compressed data and the system for the expansion processing (MPEG or JPEG) is selected depending on the code indicating the compression processing system added to the read compressed data at reproduction.

CLAIMS

[Claim(s)]
[Claim 1]An image recorder comprising:
A conversion method which changes a video signal into a digital signal.
A codec part which performs selectively compression processing of an MPEG system or a JPEG system to said digital signaland generates compressed data.
The Records Department which records said compressed data.
A selection indication means of compression mode management for performing selection instructing of whether compression processing is carried out with an

MPEG systemor to carry out compression processing with a JPEG system.

[Claim 2]An image recorder changing a method of compression processing by said codec part in the image recorder according to claim 1 according to directions by said selection indication means.

[Claim 3]An image recorder adding and recording a code which shows a method of compression processing to said compressed data in the image recorder according to claim 1 according to directions by said selection indication means.

[Claim 4]An image recorder characterized by said codec part being a circuit which is communalized and performs processing of an MPEG systemand processing of a JPEG system in the image recorder according to claim 1.

[Claim 5]An image recorder characterized by said video signal being a signal acquired from an image sensor in the image recorder according to claim 1.

[Claim 6]An image recorder characterized by said Records Department being a hard disk in the image recorder according to claim 1.

[Claim 7]Picture reproducer comprising:

The Records Department which inputs and records compressed data which compression processing is performed and is generated with an MPEG system or a JPEG system.

A setting means for specifying data reproduced among compressed data recorded on said Records Department.

A reading means which searches and reads compressed data specified by said setting means from said Records Department.

A conversion method which changes into a video signal a codec part which performs selectively elongation processing of an MPEG system or a JPEG system to said compressed dataand generates a digital signaland a digital signal generated by said codec part.

[Claim 8]Picture reproducer changing a method of elongation processing in said codec part in the picture reproducer according to claim 7 according to compressed data read by said reading means.

[Claim 9]In the picture reproducer according to claim 7a code which shows a method of compression processing to compressed data of said Records Department is added beforehandPicture reproducer characterized by changing a method of elongation processing in said codec part according to a code which shows a method of said compression processing added to compressed data read by said reading means.

[Claim 10]Picture reproducer characterized by said codec part being a circuit which is communalized and performs processing of an MPEG systemand processing of a JPEG system in the picture reproducer according to claim 7.

[Claim 11]Picture reproducerwherein said video signal is outputted to a built-in display in the picture reproducer according to claim 7.

[Claim 12]Picture reproducer characterized by said Records Department being a hard disk in the picture reproducer according to claim 7.

[Claim 13]Image recording playback equipment which changes a video signal into a digital signalrecords itchanges a digital signal into a video signaland is reproducedcomprising:
A codec part which performs selectively compression processing of an MPEG system or a JPEG system to said digital signal at the time of recordgenerates compressed dataperforms selectively elongation processing of an MPEG system or a JPEG system to said compressed data at the time of reproductionand generates a digital signal.
The Records Department which records said compressed data.
A selection indication means of compression mode management for performing selection instructing of whether compression processing is carried out with an MPEG systemor to carry out compression processing with a JPEG system.
A setting means for specifying data reproduced among compressed data recorded on said Records Departmentand a reading means which searches and reads compressed data specified by said setting means from said Records Department.

[Claim 14]In the image recording playback equipment according to claim 13at the time of record. Image recording playback equipment characterized by changing a method of compression processing by said codec partand changing a method of elongation processing in said codec part according to compressed data read by said reading means at the time of reproduction according to directions by said selection indication means.
[Claim 15]In the image recording playback equipment according to claim 13at the time of record. According to directions by said selection indication meansadd a code said Records Department indicates a method of compression processing to be to said compressed datamake it recordand at the time of reproduction. Image recording playback equipment characterized by changing a method of elongation processing in said codec part according to a code which shows a method of compression processing added to compressed data read by said reading means.
[Claim 16]An image recorder characterized by said codec part being a circuit which is communalized and performs processing of an MPEG systemand processing of a JPEG system in the image recording playback equipment according to claim 13.
[Claim 17]Image recording playback equipment which a video signal to record is a signal acquired from an image sensor in the image recording playback equipment according to claim 13and is characterized by outputting a video signal to reproduce to a built-in display.
[Claim 18]Image recording playback equipment characterized by said Records Department being a hard disk in the image recording playback equipment according to claim 13.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to a portable digital video camera.
[0002]
[Description of the Prior Art]As a Prior artas shown in JP2–292974Asemiconductor memory has an electrophotography system which records a still picture signaland what is called an electronic "still" camera as a video signal. By the spread of personal computerswhile low-pricing of recording mediasuch as semiconductor memory and a hard diska miniaturizationand large scale-ization progressin recent yearsthe hard disk in which small equipment had also become possible to record of more still pictures or an animationand had the capacity of about 300 MByte with card size by progress of the bit reduction art represented by JPEG and MPEG is realized. In this casein a still pictureit becomes recordable [about 20 minutes] by the animation using about 3000 sheets and MPEG compression with the still picture using JPEG compression.
[0003]
[Problem(s) to be Solved by the Invention]The technical problem of this invention adopts an above-mentioned MPEG system and JPEG system as portable small equipmentand enables it to record much dynamic image compression data and still picture compressed dataand also there is in providing the device which enabled it to search and reproduce much recorded data.
[0004]
[Means for Solving the Problem]In order to solve an aforementioned problemthis invention adopted the following composition.
[0005]Compression processing to picture image data is changed according to the mode of an animation (MPEG) and a still picture (JPEG)and is performed in one compression expansion circuita method of compressed data is distinguishedand it enabled it to record. After search of recorded data is one compression expansion circuitelongation processing to compressed data is changed according to the mode of an animation (MPEG) and a still picture (JPEG)and it performs [a method of distinguished data is distinguished] itand enabled it to reproduce it.
[0006]
[Embodiment of the Invention]The embodiment of this invention is described using drawing 15 from drawing 1 below.
[0007]Drawing 1 shows the flow of the software of one embodiment which applied this invention.
[0008]Drawing 2 is an example of the appearance of the portable digital video camera 200 in which the software of the embodiment shown in drawing 1 operates. This machine 200 can carry out record reproduction of the signal of NTSC or a PAL television system.
[0009]Drawing 3 is an enlarged drawing of the operation switch portion of one embodiment of drawing 2. In the portable digital video camera 200 of drawing 2as the whole compositionthe digital moving image signal acquired from the camera system is compressed into MPEG(the abbreviation for Moving Picture Expert

Group) 1 formatand it records on memory card. In reproductionthe signal of the MPEG1 format currently recorded on the memory card is developedand it displays on the built-in display 201. The display to which the display was connected outside does not interfereeither. In addition to an MPEG video datathe portable digital video camera 200 of drawing 2 can record the audio formats of JPEG which is still picture dataand MPEG which is voice data.

[0010]Drawing 4 shows the outline of the circuit block of the portable digital video camera 200. Firstan example of the procedure which records an animation is explained using the portable digital video camera 200. If the recording switch 301 is pushed by the userthe object image acquired from the lens 401 will be changed into an electrical signal by CCD sensor 402. The CDS (Correlated Double Sampling) circuit where the signal read from the sensor 402 oppresses low frequency wave noiseIn order to make a signal level stabilityafter electrical treatment is performed in the circuit 403 which unified the AGC circuit which performs automatic gain controlit is changed into a digital signal by ADC404 and inputted into the camera signal processing circuit 405.

[0011]The camera signal processing circuit (camera DSP) 405It comprises a function to change a sensor output digital pixel signal into the luminance signal Y and the color-difference signals U and V by a matrix circuita function which adds a synchronized signala function to adjust the relation between an iris and shutter speeda function to adjust a white balancea function that carries out a zoom expansion in digital oneetc. Said camera DSP405 outputs the level vertical driving signal pulse of CCD sensor 402and he is trying to read the signal of CCD sensor 402although a full account is not given in drawing 4taking timing with a synchronized signal. The camera control microcomputer 406 supplies the parameter in operation of DSP405 to camera DSP405and controls the whole camera system.

[0012]On the other handit is sent to the encoder 409 of MPEG1 which is a standard compression format of an animation digital signal by the digital bus linedata is compressedand the luminance signal Y by digital one obtained from camera DSP405 and the color-difference signals U and V are changed into digital data. 410 is a work memory at the time of performing MPEG1 encoding. The data furthermore changed into MPEG1 is sent to the microcomputer 411 which controls the transmission rate of digitized output dataand the whole animation compression system is constituted with the MPEG1 encoder 409.

[0013]The microcomputer 411 which controls a transmission rate stores the data by which MPEG1 formatting was carried out in the buffer memory 412 in fixed quantityand via the interface circuit 413It goes via the card connector 414 of the PCMCIA specification which comprises 68 pinsIt transmits to the memory card type hard disk (following HDD) 415 of the PC card standard which PCMCIA (the abbreviation for Personal Computer Memory Card International Association) defined.

[0014]Herehow to record an animation image was explained in detail. On the other handwhen a still picture recording mode is chosen by the userMPEG encoder 409

changes to the compression circuit of JPEGstill picture data is generated from 409and it is sent to the microcomputer 411. MPEG compressed data processing and JPEG compression data processing have many common appearancesand since they can save circuit structurethey are known as an effective method.

[0015]As for an audio signala sound is changed into an analog electric signal from the microphone 418Become digital data by ADC419 for soundsand voice data is incorporated into a data bus by MPEG encoder 409Compression based on the MPEG format with the microcomputer 411 is performed by softwareand is serially added with the above mentioned animation image or still picture data.

[0016]ThusMPEG/JPEG ENC/DEC409 shown in drawing 4 forms the codec part (numerals and decoder) by which MPEG compressed data processing and JPEG compression data processing are selectively performed on the basis of directions of the mode select by a user.

[0017]According to this embodimentin addition to the data by which MPEG1 formatting was carried outthe portable digital video camera 200 can also record the data by which JPEG formatting was carried outand the data of only the sound by which MPEG1 formatting was carried out.

[0018]Under the present circumstancesthe numerals showing any of the date and time when the recording switch 301 was pushedthe data by which MPEG1 formatting was carried outthe data by which JPEG formatting was carried outand the data of only the sound by which MPEG1 formatting was carried out the microcomputer 411 is are recorded. The numerals which express a classification as a means of search of the data currently recordedand the numerals showing whether operation of deleting the recorded data is forbidden are recorded. At the time of recorda classification is once recorded on the numerals showing good [of the numerals which show not having classifiedand the operation to delete]and a failure as deletion being possible.

[0019]Herein general disk operation systemthe numerals which show the above-mentioned photographing mode are distinguished using the code which shows the method of data. The numerals showing a classification and the numerals showing whether data deletion is possible are recorded on the individual file related with data.

[0020]The digital signal inputted into above camera DSP405 as a monitor signal at the time of record on the other hand turns into an analog TV signal by NTSCor the PAL encoder and DAC which were built in this circuit 405and is outputted to the output terminal 416 and the built-in display 201. Although this example explained the video data with a sound of MPEG1processing that the data of only JPEG and MPEG first-sound voice is also the same is performed.

[0021]When a system is reproductionthe above-mentioned recording mode and a signal flow conversely. Drawing 16 is the flow chart which showed it. Firstthe text data which has shown the information on data is read from HDD415. Nextfrom the list list of the data which is the feature of this invention displayed on the built-in display 201a user searches data and specifies data to reproduce using the operation switch 408. And a file system is started and data is read to the

microcomputer 411 from HDD415.

[0022]Herethe method of data is distinguishedin the case of an animationdecoding of an MPEG imagedecoding of an MPEG soundand in the case of a still picturein the case of decoding of a JPEG imageand a sound with a still picturedecoding of a JPEG image and decoding of an MPEG sound are performedrespectivelyand reproduction drawing is displayed.

[0023]Herethe indication signal by the operation switch 408 is read by the sub microcomputer 407and is sent to the microcomputer 411 via the camera control microcomputer 406. The software program of this embodiment is read from ROM417 (ReadOnlyMemory) for program storageand is executed. According to this embodimentalthough the place of program storage was set to ROM417it does not interfere with memory storagesuch as FlashRAM and HDDeither.

[0024]Nextthis data is transmitted to the buffer memory 412 via PCMCIA connector 414 and the interface circuit 413 at data. Timing is controlled by the microcomputer 411 and the data stored in the buffer memory 412 is sent to the MPEG1 decoder 409. The circuit of 409 has the composition that coding of MPEG1 and decryption switch.

[0025]The data decoded by the MPEG1 decoder 409 is sent to camera DSP circuit 405 by the digital bus lineIt is changed into an analog video signal by NTSCor the PAL encoder and DAC which were built in this circuit 405and is outputted to the device exterior from the output terminal 416 and the built-in display 201. Although this example explained the video data with a sound of MPEG1processing that the data of only JPEG and MPEG first-sound voice is also the same is performed.

[0026]In this embodimentsince HDD with a capacity of 260 MB is used for HDD415 which is memory storagewhen only especially the still picture of a JPEG format is recordedrecord of the still picture data of about 3000 sheets is possible. In this inventionit can search at high speed and easily by using the function to classify also to 3000 data.

[0027]Although drawing 4 shows the circuitry about an animation imageabout a still picture and a soundthe circuitry corresponding to drawing 4 is needed. In this inventionnamelyan animation image imaging meansa still picture imaging meansand a voice microphoneIt is ** constituted with an animation image digital conversion processing meansa still picture digital conversion processing meansa voice digital conversion meansand said animation imagea still picture and a voice digital signal recording device.

[0028]Drawing 5 gets the size of a screen blocked 1.8 inches (45.7 mm) in length of the vertical angle as an embodiment of this invention at the built-in display 201it is 36.6 mm wide and 27 mm longand the screen-display composition at the time of using the liquid crystal panel whose pixel configurations of a screen are 352 pixels x 240 pixels is shown. In order to realize the low power consumption of the portable digital video camera 200and a miniaturizationa 1.8-inch liquid crystal was used for the built-in display 201.

[0029]The screen-display composition 500 can carry out the a maximum of 20

character x9 character representation of the character which comprises 16 pixels x 24 pixels. In the 1.8-inch liquid crystal used by this embodimentthe size of 16 pixels x 24 pixels of a character is compatible with the minimum size that is easy to recognize as a character in the efficient coding at the time of binary-izing alphabetic data. Since the display connected to the output terminal 416 and the built-in display 201 cannot display all the fields of this screenthe space of the screen left-hand side 501the screen right-hand side 502the screen upper part 503and the screen bottom 504 is set up.

[0030]It is a field which displays the state where the software of this embodiment is operating on the operating state viewing area 505. It is a field for displaying on it the small screen which carries out the item display of the function to make it operatewhen the information on record data and a user push the function switch 304 on the field 506 and carry out detailed setting of data to it. The operating procedure which suggests an operation method to a user is displayed on the operating procedure viewing area 507.

[0031]Drawing 6 is the display screen 600 displayed when the soft start switch 303 is pushed by the user in order to start the software of this embodiment. The display screen 600 is equivalent to the classification selection 101 of drawing 1 in which the change state of operation is shown. As described previouslythe data recorded by the user is unconditionally recorded as un-classifying at the time of record. The number displayed on the line which is not classified 601 expresses 602 video datas with a sound of MPEG1603 still picture data of JPEGand the data number 604 of only MPEG first-sound voicerespectively.

[0032]The numerical value displayed on each line of the mark 605 which shows the 1st classification similarlythe mark 606 which shows the 2nd classificationand the mark 607 which shows the 3rd classification expresses the number of the data arbitrarily classified by the user. The mark 608 which displays all the data collectively shows the total of un-classifying 601the 1st classification 605the 2nd classification 606and the 3rd classification 607.

[0033]The mark 609 which shows abandonment temporarily is the classification for discarding temporarily so that a user may not delete data accidentallyand a user enables it to move temporarily the data classified into un-classifying and the 1st to 3rd classification. The number displayed on the line of the mark 609 which expresses abandonment temporarily does not include the number displayed on the line of the mark 608 which displays all the data collectively.

[0034]That the line of the mark 601 showing un-classifying is displayed in white does not interfere with any modes of expression other than a display in whitesuch as changing a coloreitheralthough it means that the mark 601 showing un-classifying is chosen as an item. The record data in which the classification place is not changed by the user using this software is contained in the classification which the line of the mark 601 showing un-classifying on a display screen shows.

[0035]If the upper arrow switch 305a of drawing 3 is pushed by the userselections will shift on a partyand if the arrow-down switch 305c is pushedselections will shift under a party.

[0036]If the upper arrow switch 305a is pushed by the user when selections are in the mark 601 showing the item of the 1st line of the viewing area 506i.e.un-classifyingin this embodimentSelections shift to the mark 609 to which selections express abandonment in the item of the 6th line of the viewing area 506i.e.temporarily. If the arrow-down switch 305c is pushed by the user when selections are in the mark 609 which expresses abandonment in the item of the 6th line of the viewing area 506i.e.temporarilyselections will shift to the mark 601 showing the viewing area 506i.e.un-classifyingof the 1st line.

[0037]If the right arrow switch 305b is pushed by the userit will shift to the screen which displays the contents of the classification which the selected line expresses.

[0038]The guide display 610 of an operating procedure is displayed so that operation can be remembered to a user at any time.

[0039]The display screen 700 for choosing individual data displayed when the mark 605 showing the 1st classification is made into selections as an example and the right arrow switch 305b is pushed by the user is shown in <u>drawing 7</u>. This function is equivalent to the data selection 102 of <u>drawing 1</u>.

[0040]The display screen 700 is a screen for searching data and reproducing from the list list of the data which is the feature of this inventionA user the data recorded using the portable digital video camera 200The mark 703 showing the kind of contents of the data in which the recording start date 701the recording start time 702an animationa still pictureand a sound are shownthe distinguishing mark 704and the mark 705 that protects deletion of the data based on the mistaken operation can be looked through as an item.

[0041]The data displayed on Screen 700 is arranged in downward from the older one in order of the record date 701 and the recording start time 702. For this reasonthe latest data recorded most newly is displayed on the highest rungand can perform search of data very effectively. It can be investigated how many displayed lists there are by the whole record dataand a page display can also be carried out like 707. In the page display 707a denominator is the number of sheets of the whole list displayand a numerator indicates the how many sheets it is.

[0042]Since the situation at the time of photography by the user who called it the kind of a recording date or data is recorded automaticallythese information does not trouble a user's hand. the work with which a user searches the target data since a user can change a classification place arbitrarily by each purpose of use -- dramatically -- simplicity -- the efficiency is increased.

[0043]since it comprises a list list which furthermore looks these all like [a character representation]and is twistedwhen time to develop the compressed image data currently recorded becomes unnecessary and a user chooses with a manual operation buttona screen can be rewritten at high speed and high-speed search becomes possible. Thereforecomfortable operativity can be providedwithout giving stress to the user who wants to choose a recorded image early.

[0044]The selection classification 706 shows the classification selected by the display screen 600. In this examplea user explains the case where the 1st

classification 605 is chosen by the display screen 600.

[0045]Although the display order watch of a list is displayed on the turn currently recorded on HDD415 by new order according to a displayi.e.the recorded date timesince the turn currently recorded on HDD415 can be changed by a user's operationthis display order watch can also be changed. The data immediately after photography is recorded on the highest rung of the viewing area 506 of a non-classification data selection display screen. What is necessary is just to carry out the reproduction check of the highest rung of the viewing area 506 of a non-classification data selection display screenwhen a user wants to check data immediately after photography.

[0046]Like the time of the display screen 600if the upper arrow switch 305a is pushed by the userselections will shift on a partyand if the arrow-down switch 305c is pushedit will shift under a party. According to this embodimentalthough it was made to carry out 6 line displays of the data on one screenwhen 6 numbered data is chosen by the user and the arrow-down switch 305c is pushed by himthe 7th data is displayed on the 1st line of the viewing area 506 by himand the 7th data is made selections. The 8th and the 9th data that continues below are displayed on the 2nd line and the 3rd line.

[0047]On the other handif the upper arrow switch 305a is pushed when the 7th data is chosenthe 7th data will be displayed on the 1st line of the viewing area 506the data of the 2ndthe 3rdthe 4ththe 5thand 6th ** will be displayed belowand the 6th data will be made into selections.

[0048]That isthe n-th data is displayed on the line of too much numerical value at the time of doing division of the n by 6 in the viewing area 506.

[0049]When the data at the earliest head and the tail end is chosen and the upper arrow switch 305a and the arrow-down switch 305c are pusheda selection row performs the list display which contains the data of the tail end and the earliest headrespectively like the time of the display screen 600and uses selections as the data of the tail end and the earliest head.

[0050]Selected data will be reproduced by the output terminal 416 and the built-in display 201if it is chosen by the user with the upper arrow switch 305a of drawing 3and the arrow-down switch 305c and the right arrow switch 305b is pushed by the user.

[0051]The upper arrow switch 305a of drawing 3 and the arrow-down switch 305c are achievedand while data is reproducedthe left arrow switch 305d plays the role of a rapid traverserewindingand a stoprespectively. If the left arrow switch 305d with the role of a safety switch is pushed by the user while data is reproducedreproduction will be stopped and the display screen 700 will be displayed again. The change state by which data is reproduced is 103 in drawing 1.

[0052]Nexta reduced screen is added to a recording date displayand the contents of data are easily explained about the display information which can be recognized. If the reduction drawing display switch 302 is pushed by the user in the state of the display screen 700the reduction drawing 801 of the display screen 800 shown in drawing 8 will be displayed. It is possible for this to improve the search nature of

data by leaps and bounds. A change state is [this reduced-display screen-display function] equivalent to the state of 104 in drawing 1.

[0053]For examplewhen the pixel number which the size of the built-in display 201 by a liquid crystal can display at 1.8 inches is 220 x 379 dotsIf the pixel number of the reduction drawing 801 is made into 48 x 64 dots (when the pixel configuration of the screen mentioned above is a liquid crystal panel which is 352x240 pixels) To the coincidence which serves as 240/48=5a next doorand a contraction image of 1/5 about lengthsees also about width from 352/5=70.4a next door48x4 / 3= 64 pixelsand serves as one fifth of contraction images with a margin for a whilethree reduction drawingsIt becomes possible to display the mark 703 showing the kind of contents of the data in which the recording start date 701the recording start time 702an animationa still pictureand a sound are shownthe distinguishing mark 704and the mark 705 that protects deletion of the data based on the mistaken operationand the visibility of reduction drawing can be secured. Reproduction of the data based on the manual operation button 305b etc.etc. are possible also for this display screen 800 like the case of the display screen 700.

[0054]Againif the reduction drawing display switch 302 is pusheda screen display will return to the display screen 600 which displays data reduction. The above-mentioned reduced screen draws with the control microcomputer 411 and MPEG encoder 409 to RAM410 of circuit block drawing 4.

[0055]Nextin the aforementioned data reduction display display screen 600 or the data selection display display screen 700a displaying condition is easily explained about the function selection display screen 900 which can be changed. While reducing operation switch mark and the function selection display screen's 900 looking at a screenin order that the user-friendliness of operation may be raisedit displayed the function item on the screen and has realized the operating system which can perform function selection operation with the operation switches 304305a305b305cand 305d of drawing 3. The change state of the display screen 900 is 105 in drawing 1.

[0056]Also in the reduced screen display screen 800a screen is displayed in the same procedurein the display screen 600it is the same procedure and a display screen with a function required in the case of the display screen 600 shown in drawing 1 is displayed. In this casethe function item of the display screen 900 does not interfereeven if the function item of the data reduction display screen 600 is not the same.

[0057]The flow of the operation in the display screen 900 is shown in drawing 10. In the display screen 700the display screen 900 is displayedwhen a user pushes the function switch 304. The switch top arrow 305a and the switch arrow down 305c perform selection movement of each item. When the switch top arrow 305a is pushed by the userselections move to the item currently displayed on one. When the switch arrow down 305c is pushedselections move to the item currently displayed on the bottom of one. The function of selections is performed when a user pushes the switch right arrow 305b. When the function switch left arrow 305d is pushedit returns to the data selection display screen 700.

[0058]As described previouslyafter carrying out data movement to a graveyard place temporarily so that a user may not delete data accidentallyby this embodimentdeletion of data is realized by the method of deleting the data contained in a graveyard place temporarily. The change state of this function is 106 in drawing 1.

[0059]The procedure of deleting data is explained below.

[0060]When data deletesdata movement is carried out to a graveyard place temporarily. In this casedrawing 9 explains the procedure which carries out selection execution of "moving to a garbage can."

[0061]Firstif the function switch 304 is taken down to the display screen 700 after selection in the data which a user wants to discard temporarily using the upper arrow 305a and the operation switch arrow down 305cthe display screen 900 will be displayed. A user will move data to the garbage can which is a graveyard place about selected data temporarilyif the switch right arrow 305b is taken down after selection in 901 "moved to a garbage can" using the operation switch top arrow 305a and the operation switch arrow down 305c. Also when the switch 306 is pushed by the userdata is moved to the garbage can which is a graveyard place about similarly selected data temporarily.

[0062]By hima user's selection of 902 of the display screen 900 "which empty a garbage can" will delete all the data in the garbage can which is a graveyard place temporarily. The change state of this function is 107 of drawing 1.

[0063]In this operating systema user does not disappear data accidentally in order to perform two steps of operations for deletion of data.

[0064]As explained previouslyat the time of recordthe state where it does not classify is assigned to each data as numerals of a classification. Howevera classification can be changed by a user's operation at the time of reproduction. Since it becomes possible to classify data by using the function of this classificationthe user-friendliness of a search service can be raised epoch-makingly because a user classifies data into purpose-oriented [of data]. The change state of this function is 108 of drawing 1.

[0065]The procedure of changing data reduction into below is explained. If the function switch 304 is pushed after choosing the data in which a user wants to change a classification by the display screen 700 using the upper arrow 305a or the operation switch arrow down 305cthe display screen 900 will be displayed. If "group change" 903 which are the function to change a classification are chosen by the user using the operation switch top arrow 305a and the operation switch arrow down 305c and the switch right arrow 305b is pushedThe display screen 1100 which changes a classification of the selected data shown in drawing 11 is displayed.

[0066]In the display screen 1100if the switch right arrow 305b is pusheda classification will circulate with unclassified ->1 ->2 ->3 -> un-classifyingwill changeand will change a classification. According to this embodimentthe switch left arrow 305d is pushed by the userand when the display screen 600 is displayedthe control microcomputer 411 performs renewal of the numerals for the

classification as a screen displayin order to enable improvement in the speed of processingand redo of a user's operation.

[0067]As described previouslyunless it operates the function which a user shows belowturn of the list shown in the display screen 700 is performed in the date of the recorded dataand the new order of time. On the other handsince a simple edit function is given at the time of reproductionturn can be changed. The change state of this function is 109 in drawing 1.

[0068]The procedure of changing data display turn into below is explained. Firstin the display screen 700a user chooses data to change display order watch into using the switch top arrow 305a and the switch arrow down 305c. A push on the function switch 304 will display the display screen 900.

[0069]If "order change of data display" 904 which are the function to change display order watch are chosen by the user using the switch top arrow 305a and the switch arrow down 305c and the switch right arrow 305b is pushedThe display screen 1200 shown in drawing 12 becomes possible [it being displayed and changing the display order watch of selected data]. By a userthe place which inserts selected data is specified using the switch top arrow 305a and the switch arrow down 305c. Nextif the switch right arrow 305b is pushedit will insert in the part which specified selected data. Under the present circumstancesas for the turn of data which suited after the part specified before insertionturn is changed into one back.

[0070]The portable digital video camera 200 of this embodiment carries the internal clockin order to display the date time which recorded the data of the display screen 700. Howeverwhen a photograph is taken at the time of the obstacle of a driving battery piece etc.the recorded date time may not be correctly displayed in the display screen 700. Soin this embodimentthe date time which recorded data can be arbitrarily changed by a user's operation. The change state of this function is 110 of drawing 1.

[0071]A date display modification procedure is explained below. In the display screen 700the data in which a user wants to change record date time is chosen using the switch top arrow 305a and the switch arrow down 305c. Nexta push on the function switch 304 will display the display screen 900. If "recording date change" 905 which are the function to change display order watch are chosen by the user using the switch top arrow 305a and the switch arrow down 305c and the switch right arrow 305b is pushedThe display screen 1300 which changes the recording date of the selected data shown in drawing 13 is displayed.

[0072]Hereif the switch top arrow 305a is pushedthe year display 1301 will be increased one timeif the switch arrow down 305c is pushed by the userit will decrease by one and the year display 1301 will be displayed by him. A push on the switch right arrow 305b will determine the year display 1301 as the numerical value currently displayed at the time. Nextthe user can specify now the change in the numerical value of the month indication 1302.

[0073]If the switch top arrow 305a is pushed similarlythe month indication 1302 will be increased one timeif the switch arrow down 305c is pushedit will decrease

by one and the month indication 1302 will be displayed. A push on the switch right arrow 305b will determine the month indication 1302 as the numerical value currently displayed at the time. Nextthe user can specify now the change in the numerical value of the Japanese display 1303.

[0074]If the switch left arrow 305d is pushedsetting out of the year display 1301 can also be redone again. By the same operationthe display 1305 and the part display 1306 can be set up in the afternoon in the Japanese display 1303 and the morning at the display 1304 and the time. After adjusting the numerical value of the part display 1306if the switch right arrow 305b is pushedchange of record date time will be ended and the date time of data will be changed into the numerical value set up newly.

[0075]When the numerical value which is not possible on calendarssuch as February 30is specifiedit changes into the date nearest to the date.

[0076]In this embodimentalthough a user can delete data freelyit is possible to give the attribute of the prohibition on deletion accidentallyto datain order that data may prevent that of deletion *****. The change state of this function is 111 in drawing 1.

[0077]Belowthe procedure which attaches a deletion protection attribute to data is explained. If the function switch 304 is pushed after choosing the data in which a user wants to change a deletion attribute using the switch top arrow 305a and the switch arrow down 305c by the display screen 700the display screen 900 will be displayed. If "lock change" 906 which are the function to change display order watch are chosen by the user using the switch top arrow 305a and the switch arrow down 305c and the switch right arrow 305b is pushedthe display screen 1400 which changes the deletion attribute of the selected data shown in drawing 14 will be displayed.

[0078]If the switch right arrow 305b is pushed by the usera deletion attribute will change cyclically in order of an improper -> good -> failure. The display of the protection mark 705 is displayed according to a deletion attribute.

[0079]According to this embodimenta user can know the remaining capacity of HDD415. The change state of this function is 112 in drawing 1.

[0080]The procedure for checking the residue of HDD415 is explained below. If the function switch 304 is pushed by the user by the display screen 700the display screen 900 will be displayed. If "status display" 907 which are the function to change display order watch are chosen by the user using the switch top arrow 305a and the switch arrow down 305c and the switch right arrow 305b is pushedthe display screen 1500 which displays the remaining capacity of HDD415 shown in drawing 15 will be displayed.

[0081]The display screen 1500 to HDD415. The residual time display 1503 at the time of recording only the remaining number-of-sheets display 1502 at the time of recording only the residual time display 1501 at the time of recording only MPEG1 video data with a sound and JPEG still picture data and MPEG first-sound voice data and the remaining capacity 1504 represented by the number of bytes can be looked through. for a usergrasp of remaining capacity is markedly alike and it

becomes easy to do it by displaying the residue shown in the unit of each data which can record the above-mentioned HDD by list.

[0082]In this embodimentalso in the operation at the time of reproduction of datathe switches 305a305dand 305c and the operation which accepts 305d and comes out are possibleand a possible point is also epoch-making in operation with the necessary minimum number of operation switches.

[0083]The point which can increase a function without increasing a manual operation button is epoch-making by using the function selection screen 900.

[0084]Other than thisthis embodiment is [but] available for this numberalthough the classification number of data was four including un-classifying. Although the list display of each data is carried out [not being based on the kind of an animationa still pictureand sound] by the data selection display screen 700 at this embodimentit is applicable also to the function automatically classified according to a user's specification according to a kind of data.

[0085]It is also possible for the control microcomputer 411 to make auto select of the dataand to reproduce for every photographing modessuch as an animation of the above-mentioned record data and a still picture. For examplea user chooses the photographing mode of only a still pictureand only an image format of a still picture can be extracted and it can reproduce.

[0086]

[Effect of the Invention]According to this inventionin order to be able to consider it as the device which can also perform compression extension of the animation by MPEG in addition to compression extension of the still picture by JPEG and to perform these compression extension moreover only in one compression expansion circuitit should miniaturize and should excel in portability. Thusthe compact apparatus simple substance of this invention can perform record reproduction of a still picture and an animation.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a state transition diagram of the software of this invention.

[Drawing 2]It is an outline view of the portable digital video camera in which the software of this invention operates.

[Drawing 3]It is an enlarged drawing of the operation switch portion of the portable digital video camera in which the software of this invention operates.

[Drawing 4]It is a circuit block figure of the portable digital video camera in which the software of this invention operates.

[Drawing 5]It is a screen-display lineblock diagram of the portable digital video camera in which the software of this embodiment operates.

[Drawing 6]It is a display screen for choosing a classification for record data.

[Drawing 7]It is a display screen for choosing record data.

[Drawing 8]It is a display screen with reduction drawing for choosing record data.

[Drawing 9]It is a display screen for choosing the detailed function of record data.

[Drawing 10]It is the flow chart which showed how to choose a detailed function.

[Drawing 11]It is a display screen for changing a classification of record data.

[Drawing 12]It is a display screen for changing the display order of record data.

[Drawing 13]It is a display screen for changing the date of record data.

[Drawing 14]It is a display screen for changing the deletion attribute of record data.

[Drawing 15]It is a display screen which displays the residue state of an archive medium.

[Drawing 16]It is the flow chart which showed how to read record data from HDD and reproduce record data.

[Description of Notations]

200 The main part of a portable digital camera

201 Liquid crystal display section

301-305 Manual operation button containing reproduction of portable digital camera apparatusa stopa rapid traverseand a rewinding cross button

411 The microcomputer which draws and controls the record data list display of this invention

415 The PC card type hard disk whose capacity is 260 M bytes

605-607 Classification distinguishing mark

610 Operating guide display

701 The record date display of record data

702 The record time display of record data

703 The mark which shows photographing mode

705 Attribute marks which show whether it can delete or not

801 Reduction drawing of record data